COMPARATIVE BIOCHEMISTRY AND PHYSIOLOGY

An International Journal

EDITOR: G. A. KERKUT (*Southampton*)

List of Contents and Author Index

Volume 80, Part C, 1985

PERGAMON PRESS

OXFORD · NEW YORK · TORONTO · SYDNEY · PARIS
FRANKFURT

Comparative Biochemistry and Physiology

Editor

Professor G. A. KERKUT, Department of Physiology and Biochemistry, University of Southampton, Southampton SO9 3TU, England (Executive Editor). Tel.: (0703) 559122

Members of the Honorary Editorial Advisory Board

T. H. BULLOCK (La Jolla)
C. B. COWEY (Aberdeen)
R. FÄNGE (Göteborg)
E. FLOREY (Konstanz)
W. S. HOAR (Vancouver)
H. KINOSITA (Saitama)
E. KREPS (Leningrad)
O. LOWENSTEIN (Birmingham)
C. MANWELL (Adelaide)
H. S. MASON (Portland)
C. L. PROSSER (Urbana)
J. ROCHE (Paris)
B. T. SCHEER (Santa Barbara)
C. A. VILLEE (Massachusetts)
G. WALD (Harvard)
J. H. WELSH (Maine)

Publishing, Subscription and Advertising Offices: *Pergamon Press Ltd, Headington Hill Hall, Oxford OX3 0BW, England* (*Tel.* Oxford 64881).

North America: *Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY* 10523, *U.S.A.*

Annual Subscription Rates 1985 (including postage and insurance)

For libraries, research establishments and all other multiple-reader institutions: combined subscription, 1-yr $1625.00; 2-yr $3087.50. Part A, Comparative Physiology $695.00; Part B, Comparative Biochemistry $695.00; Part C, Comparative Pharmacology and Toxicology $400.00 (2-yr subscription rates: Part A, $1325.50; Part B, $1325.50; Part C, $760.00).

Specially Reduced Rates to Individuals

In the interests of maximizing the dissemination of the research results published in this important international journal we have established a two-tier price structure. Any individual whose institution takes out a library subscription may purchase a second or additional subscription for personal use at the much reduced rate of $160.00 per annum (combined subscription). Part A, Comparative Physiology $75.00; Part B, Comparative Biochemistry $75.00; Part C, Comparative Pharmacology and Toxicology $60.00. Parts A and B: Three volumes of each part per year, four issues per volume (Part A—1st of the month; Part B—15th of the month). Part C: Three volumes per year, two issues per volume (commencing Vol. 50, No. 1, 1975).

Microform Subscriptions and Back Issues

Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.

Copyright © 1985 Pergamon Press Limited

It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organisations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A.
The Item-Fee Code for this publication indicates that authorisation to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for the copying beyond that permitted by Section 107 or 108 of the United States Copyright Law is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 21 Congress Street, Salem, MA 01970. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying. In case of doubt please contact your nearest Pergamon office.

The Item-Fee Code for this publication is: 0306-4492/85 $3.00 + 0.00

PERGAMON PRESS
HEADINGTON HILL HALL, OXFORD OX3 0BW, ENGLAND
MAXWELL HOUSE, FAIRVIEW PARK, ELMSFORD, NY 10523, U.S.A.

CONTENTS OF VOLUME 80C

Vol. 80C, *No.* 1

Minireviews

Avital Schurr 1 Marihuana: much ado about THC

H. Stone and J. Overnell 9 Non-metallothionein cadmium binding proteins

General Papers

O. W. Witte, E.-J. Speckmann and J. Walden 15 Acetylcholine responses of identified neurons in *Helix pomatia*—I. Interactions between acetylcholine-induced and potential-dependent membrane conductances

O. W. Witte, E.-J. Speckmann and J. Walden 25 Acetylcholine responses of identified neurons in *Helix pomatia*—II. Pharmacological properties of acetylcholine responses

O. W. Witte, E.-J. Speckmann and J. Walden 37 Acetylcholine responses of identified neurons in *Helix pomatia*—III. Ionic composition of the depolarizing currents induced by acetylcholine

W. E. G. Müller, R. K. Zahn, M. J. Gasić, N. Dogović, A. Maidhof, C. Becker, B. Diehl-Seifert and E. Eich 47 Avarol, a cytostatically active compound from the marine sponge *Dysidea avara*

D. P. Giles and P. N. R. Usherwood 53 Locust nymphal neurones in culture: a new technique for studying the physiology and pharmacology of insect central neurones

G. Mark Holman and Benjamin J. Cook 61 Proctolin, its presence in and action on the oviduct of an insect

Benjamin J. Cook and G. Mark Holman 65 The role of proctolin and glutamate in the excitation–contraction coupling of insect visceral muscle

S. C. R. Lummis and D. B. Sattelle 75 Binding of *N*-[propionyl-^{3}H]propionylated α-bungarotoxin and L-[benzilic-4,4′-^{3}H]quinuclidinyl benzilate to CNS extracts of the cockroach *Periplaneta americana*

Z. Gregus, F. Varga and A. Schmelás 85 Age-development and inducibility of hepatic glutathione *S*-transferase activities in mice, rats, rabbits and guinea-pigs

Sergio J. Iturri, Jorge Crossley and Alexis Torres 91 The effect of prostaglandins $F_{2\alpha}$ and E_2 on the adrenergic activity of the uterus of laying hens (*Gallus domesticus*) *in vitro*

J. M. Bouquegneau, C. Ballan-Dufrancais and A. Y. Jeantet 95 Storage of Hg in the ileum of *Blatella germanica*: biochemical characterization of metallothionein

Ann White and Thelma C. Fletcher 99 The influence of hormones and inflammatory agents on C-reactive protein, cortisol and alanine aminotransferase in the plaice (*Pleuronectes platessa* L.)

Stefan Nilsson and Susanne Holmgren 105 D- and L-isoprenaline have different effects on adrenoceptors in the systemic vasculature of the cod, *Gadus morhua*

P. A. Benoit and T. Yorio 109 Alteration of membrane permeability by amphotericin B

George M. Dalich and Robert E. Larson 115 A comparative study of the hepatotoxicity of monochlorobenzene in the rainbow trout (*Salmo gairdnerii*) and the Sprague–Dawley rat

Bao Shan Ku, Kazuo Isobe and Hiroshi Takeuchi	123	Pharmacological characteristics of four giant neurons identified in the cerebral ganglia of an African giant snail (*Achatina fulica* Férussac)
George I. Drummond, Sandra Wernham and Ken Lukowiak	129	Stimulation of adenylate cyclase in the heart of *Aplysia californica* by biogenic amines
Susan W. Karr, Robert E. Reinert and Adelbert E. Wade	135	The effects of temperature on the cytochrome P-450 system of thermally acclimated bluegill
Tadashi Fujita, Hiroyoshi Kasatani, Kaoru Suzuki and Yohko Fujimoto	141	Comparison of the effects of calcium α-glycerophosphate and Ca^{2+} on prostaglandin synthesis in rabbit kidney medulla slices
J. J. Johnston and M. D. Corbett	145	The effects of temperature, salinity and a simulated tidal cycle on the toxicity of fenitrothion to *Callinectes sapidus*
Louis J. Guillette, Jr, David O. Norris and Mark F. Norman	151	Response of amphibian (*Ambystoma tigrinum*) oviduct to arginine vasotocin and acetylcholine *in vitro*: influence of steroid hormone pretreatment *in vivo*
P. J. Davis, J. Bragg and K. M. W. Keough	155	Respiration of mitochondria from the gonads of the sea urchin, *Strongylocentrotus droebachiensis*: the effects of petroleum fractions on oxygen consumption
Daniel R. Doerge and Michael D. Corbett	161	The action of α-ketoglutarate dehydrogenase on 4-chloronitrosobenzene: evidence for species-dependent differences in active site properties
Hajime Murakami, Toshinori Ishikawa and Hiroshi Watanabe	167	Effects of Ca-antagonists and antispasmodic drugs on contraction by ACh in molluscan smooth muscle
Andrew Barber	175	Actions of acetylcholine on the salivary gland cells of the pond snail, *Planorbis corneus*
A. Mas and Ll. Arola	185	Cadmium and lead toxicity effects on zinc, copper, nickel and iron distribution in the developing chick embryo
R. Gonzàlez-Duarte and Ll. Vilageliu	189	Metabolic response to ethanol and isopropanol in *D. funebris* and *D. immigrans*
Maria Eugenia Letelier, Eugenia Del Villar and Emilio Sanchez	195	Drug tolerance and detoxicating enzymes in *Octodon degus* and Wistar rats. A comparative study
W. A. Maher	199	The presence of arsenobetaine in marine animals
Judith K. Marquis	203	Osmotically-induced trapping of terbium ions in axonal membrane vesicles
Kenneth A. Skau	207	Acetylcholinesterase molecular forms in serum and erythrocytes of laboratory animals

Vol. 80C, *No.* 2

Hiroaki Kasukawa and Ryozo Fujii	211	Receptor mechanisms in fish chromatophores—VII. Muscarinic cholinoceptors and alpha adrenoceptors, both mediating pigment aggregation, strangely coexist in *Corydoras* melanophores
M. J. McBroom and J. D. Welty	217	Comparison of taurine–verapamil interaction in hamsters and rats
C. Suter and P. N. R. Usherwood	221	Action of acetylcholine and antagonists on somata isolated from locust central neurons

D. Giles and P. N. R. Usherwood	231	The effects of putative amino acid neurotransmitters on somata isolated from neurons of the locust central nervous system
Renata Piccoli, Dominique Melck, Antonietta Spagnuolo, Stefania Vescia and Laura Zanetti	237	Endogenous opioids in marine invertebrates
Mark S. Wright and Benjamin J. Cook	241	Distribution of calmodulin in insects as determined by radioimmunoassay
Hiroyasu Kinemuchi, Yumi Sunami, Miyuki Sudo, Yoo Hun Suh, Yuichiro Arai and Kazuya Kamijo	245	Membrane lipid environment of carp brain and liver mitochondrial monoamine oxidase
D. E. Watenpaugh and T. L. Beitinger	253	Oxygen consumption in fathead minnows (*Pimephales promelas*) following acute exposure to water-borne selenium
John M. Frazier, Stephen S. George, Julian Overnell, Thomas L. Coombs and J. Kagi	257	Characterization of two molecular weight classes of cadmium binding proteins from the mussel, *Mytilus edulis* (L.)
Keld Sorensen, Katharina Gennari, Urs Brodbeck, Peter Landauer and Manfred Liefländer	263	Polymorphism and immunochemical cross-reactivity of acetylcholinesterases from the brains of human, dog, hog, bovine and horse
Inger Wahlqvist	269	Physiological evidence for peripheral ganglionic synapses in adrenergic pathways to the swimbladder of the Atlantic cod, *Gadus morhua*
D. Benton, J. C. Dalrymple-Alford, P. F. Brain and Veronika Grimm	273	Pre-natal administration of diazepam improves radial maze learning in mice
Bernard Cornillon, Jacqueline Paul, Jean Belleville, Anne Marie Aurousseau, Guy Clendinnen and Rosy Eloy	277	Experimental DMNA induced hepatic necrosis: early course of haemostatic disorders in the rat
James C. K. Lai and John P. Blass	285	Differences in the responses of brain cytosolic and mitochondrial hexokinases to three essential divalent metal ions
James C. K. Lai, Andrea Baker, Ken C. Carlson Jr. and John P. Blass	291	Differential effects of monovalent, divalent and trivalent metal ions on rat brain hexokinase
J. F. Heisinger and Lynn Scott	295	Selenium prevents mercuric chloride induced acute osmoregulatory failure without glutathione peroxidase involvement in the black bullhead (*Ictalurus melas*)
Keith B. Pierson	299	Isolation and partial characterization of a non-thionein, zinc-binding protein from the liver of rainbow trout (*Salmo gairdneri*)
Rodney A. Webb	305	The uptake and metabolism of 5-hydroxytryptamine by tissue slices of the cestode *Hymenolepis diminuta*
R. P. Bobbin, S. C. Bledsoe Jr., S. Winbery, G. Ceasar and G. L. Jenison	313	Comparative actions of GABA and acetylcholine on the *Xenopus laevis* lateral line
Michael S. Denison, Joshua W. Hamilton and Christopher F. Wilkinson	319	Comparative studies of aryl hydrocarbon hydroxylase and the *Ah* receptor in nonmammalian species
Giulio Franco Paciotti and William J. Higgins	325	Potentiation of the 5-hydroxytryptamine-induced increases in myocardial contractility in *Mercenaria mercenaria* ventricle by forskolin

Toshio Matsuoka, Kazuko Watanabe and Hiroshi Takeuchi	331	Pharmacological characteristics of three silent giant neurons, v-LPSN, v-l-VOrN and v-VLN, identified on the ventral surface in the left parietal and the visceral ganglia of the suboesophageal ganglia of an African giant snail (*Achatina fulica* Férussac)
David W. Wells and Robert B. Hill	337	The possible role of serotonin in the rhythmicity of the crop of *Aplysia dactylomela*
K. Abe and C. Dawes	347	The effects of oxymetazoline on secretion of protein and some electrolytes by rat submandibular and parotid glands
Kathleen Healy Moore and Flora J. Solomon	355	Cardiac and hepatic acyl-CoA and acylcarnitine hydrolase activities in clofibrate-fed rabbits
Keiichi Tonosaki and Tatsuaki Shibuya	361	The effect of some drugs on the mitral cell odor-evoked responses in the gecko olfactory bulb
V. Leskovac, S. Trivić and M. Kalčo	371	Induction of liver glycogenolysis by phenylephrine: comparison between superfusion and perfusion techniques
Sania A. I. Shaddad, I. A. Wasfi, M. A. Maglad and S. E. I. Adam	375	The effect of oxytetracycline on growth and lipid metabolism in poultry
M. Barrionuevo, A. Reche, M. S. Campos and F. J. Mataix	381	Study of absorption and retention of nitrogen in fast growing rats—II. Influence of IMAO (nialamide)
G. T. Kobzar and S. A. Shelkovnikov	385	Cholinoreceptors of the dentis retractor muscle of the sea urchin *Strongylocentrotus intermedius*
G. T. Kobzar and S. A. Shelkovnikov	395	The muscle chemoreceptors of the ascidian *Halocynthia aurantium*
Jeremie Menguelle, Suzel Fuzeau-Braesch and Christian Papin	401	The influence of glutathione on the resistance to lindane of the migratory locust *Locusta migratoria cinerascens*
Rune Berglind	407	The effects of cadmium on ALA-D activity, growth and haemoglobin content in the water flea, *Daphnia magna*
Esperanza Martinez-Conde, María Luisa Leret and Silvia Diaz	411	The influence of testosterone in the brain of the male rat on levels of serotonin (5-HT) and hydroxyindole-acetic acid (5-HIAA)
Raymond Chichery and Marie-Paule Chichery	415	Motor and behavioural effects induced by putative neurotransmitter injection into the optic lobe of the cuttlefish, *Sepia officinalis*
E. Edward Bittar and Geoffrey Chambers	421	The modulatory action of 5-hydroxytryptamine on sodium efflux: the barnacle muscle fibre as a model system
David J. Hoffman, J. Christian Franson, Oliver H. Pattee, Christine M. Bunck and Helen C. Murray	431	Biochemical and hematological effects of lead ingestion in nestling American kestrels (*Falco sparverius*)

AUTHOR INDEX

Vol. 80C, *No.* 1–2

Abe, K. 347
Adam, S. E. I. 375
Arai, Y. 245
Arola, Ll. 185
Aurousseau, A. M. 277

Baker, A. 291
Ballan-Dufrancais, C. 95
Barber, A. 175
Barrionuevo, M. 381
Becker, C. 47
Beitinger, T. L. 253
Belleville, J. 277
Benoit, P. A. 109
Benton, D. 273
Berglind, R. 407
Bittar, E. E. 421
Blass, J. P. 285, 291
Bledsoe, S. C. Jr., 313
Bobbin, R. P. 313
Bouquegneau, J. M. 95
Bragg, J. 155
Brain, P. F. 273
Brodbeck, U. 263
Bunck, C. M. 431

Campos, M. S. 381
Carlson, K. C. Jr., 291
Ceasar, G. 313
Chambers, G. 421
Chichery, M.-P. 415
Chichery, R. 415
Clendinnen, G. 277
Cook, B. J. 61, 65, 241
Coombs, T. L. 257
Corbett, M. D. 145, 161
Cornillon, B. 277
Crossley, J. 91

Dalich, G. M. 115
Dalrymple-Alford, J. C. 273
Davis, P. J. 155
Dawes, C. 347
Del Villar, E. 195
Denison, M. S. 319
Diaz, S. 411
Diehl-Seifert, B. 47
Doerge, D. R. 161
Dogovic, N. 47
Drummond, G. I. 129

Eich, E. 47
Eloy, R. 277

Fletcher, T. C. 99
Franson, J. C. 431
Frazier, J. M. 257
Fujii, R. 211
Fujimoto, Y. 141
Fujita, T. 141
Fuzeau-Braesch, S. 401

Gasic, M. J. 47
Gennari, K. 263
George, S. G. 257
Giles, D. P. 53, 231
Gonzalez-Duarte, R. 189
Gregus, Z. 85
Grimm, V. 273
Guillette, L. J. Jr., 151

Hamilton, J. W. 319
Heisinger, J. F. 295
Higgins, W. J. 325
Hill, R. B. 337
Hoffman, D. J. 431
Holman, G. M. 61, 65
Holmgren, S. 105

Ishikawa, T. 167
Isobe, K. 123
Iturri, S. J. 91

Jeantet, A. Y. 95
Jenison, G. L. 313
Johnston, J. J. 145

Kagi, J. 257
Kalco, M. 371
Kamijo, K. 245
Karr, S. W. 135
Kasatani, H. 141
Kasukawa, H. 211
Keough, K. M. W. 155
Kinemuchi, H. 245
Kobzar, G. T. 385, 395
Ku, B. S. 123

Lai, J. C. K. 285, 291
Landauer, P. 263
Larson, R. E. 115
Leret, M. L. 411
Leskovac, V. 371
Letelier, M. E. 195
Lieflander, M. 263
Lukowiak, K. 129
Lummis, S. C. R. 75

Maglad, M. A. 375
Maher, W. A. 199
Maidhof, A. 47
Marquis, J. K. 203
Martinez-Conde, E. 411
Mas, A. 185
Mataix, F. J. 381
Matsuoka, T. 331
McBroom, M. J. 217
Melck, D. 237
Menguelle, J. 401
Moore, K. H. 355
Muller, W. E. G. 47
Murakami, H. 167
Murray, H. C. 431

Nilsson, S. 105
Norman, M. F. 151
Norris, D. O. 151

Overnell, J. 9, 257

Paciotti, G. F. 325
Papin, C. 401
Pattee, O. H. 431
Paul, J. 277
Piccoli, R. 237
Pierson, K. B. 299

Reche, A. 381
Reinert, R. E. 135

Sanchez, E. 195
Sattelle, D. B. 75
Schmelas, A. 85
Schurr, A. 1
Scott, L. 295
Shaddad, S. A. I. 375
Shelkovnikov, S. A. 385, 395
Shibuya, T. 361
Skau, K. A. 207
Solomon, F. J. 355
Sorensen, K. 263
Spagnuolo, A. 237
Speckmann, E.-J. 15, 25, 37
Stone, H. 9
Sudo, M. 245
Suh, Y. H. 245
Sunami, Y. 245
Suter, C. 221
Suzuki, K. 141

Takeuchi, H. 123, 331
Tonosaki, K. 361
Torres, A. 91
Trivic, S. 371

Usherwood, P. N. R. 53, 221, 231

Varga, F. 85
Vescia, S. 237
Vilageliu, Ll. 189

Wade, A. E. 135
Wahlqvist, I. 269
Walden, J. 15, 25, 37
Wasfi, I. A. 375
Watanabe, H. 167
Watanabe, K. 331
Watenpaugh, D. E. 253
Webb, R. A. 305
Wells, D. W. 337
Welty, J. D. 217
Wernham, S. 129
White, A. 99
Wilkinson, C. F. 319
Winbery, S. 313
Witte, O. W. 15, 25, 37
Wright, M. S. 241

Yorio, T. 109

Zahn, R. K. 47
Zanetti, L. 237

Printed in Great Britain by A. Wheaton & Co. Ltd. Exeter